

# **Moving the 1990 Census Transportation Planning Package to a GIS Platform**

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**May 5, 2001**

**Best Printed in Color**

## **Abstract**

This paper describes a step-by-step approach for moving the 1990 Census Transportation Planning Package data from its proprietary extraction format to a commonly used Geographic Information System platform. This paper was prompted by several needs. First, was the fact that the 1990 public release version of the data resides in a proprietary software written to run with Windows98 and NT 4.0 or earlier operating systems. It will not run on the newer versions of Windows 2000 or NT 5.0. Second and more important, were the many requests from the user community for some guidance on a conversion process. By providing the user community with the guidance described in this paper we hope to help extend the utility of the data for many years to come.

This paper is organized into three sections. Section 1 is a general introduction to the topic. Section 2 illustrates the general principles for doing a conversion, while section 3 presents a detailed step-by-step demonstration for the Washington D.C. area.

## **Disclaimer**

This document was prepared to assist those who want to use the 1990 CTPP data in a GIS platform, specifically Arcview. We are aware that this may not be the only way to do the conversion, nor are we endorsing any software by demonstrating our method. This must be treated as a “working paper” developed for the sole purpose of helping the CTPP user community to effectively use the 1990 CTPP. Neither we, nor our employers, specifically the U.S. DOT endorse this as the only method, or endorse any of the software referenced in the paper. While we took care to test the method, we do not own any legal responsibility if this method does not work.

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## 1.0 Introduction

When the 1990 Census Transportation Planning Package (CTPP) data became available, it was packaged in one of two ways. The first releases were distributed to States and MPOs in a format approximating the more traditional census products such as the STF (Standard Tape Files) and PL (Public Law) -94-171 series. These first releases came with no extraction software and required an experienced programmer and sophisticated software (such as SPSS, SAS etc.). While this worked for many of the advanced users, most preferred to wait for a CD-ROM version packaged with its own extraction software.

The CD-ROM version was developed under a Bureau of Transportation Statistics (BTS) contract and featured extraction software called TRANSVU. TRANSVU was developed as proprietary software by Caliper Corporation. This software allowed the users to “custom” view the data, map it and print selected tables. For the first time in the history of the CTPP development, TRANSVU filled the need for general-purpose extraction software. Although the database used TRANSVU for its extraction it was readily exportable to several GIS packages including TRANSCAD, or Maptitude. While this served several users very well, there were others who expressed the desire to move the data from TRANSVU to other GIS platforms and applications. This paper addresses that need.

TRANSVU was developed under a DOS-based operating system for Windows 3.1 or Windows 95. Later modifications were purchased which allowed it to run on Windows98 and Windows NT. However, as operating systems keep evolving the original sponsors of the CTPP data product have not been able to keep pace with continued purchases of new patches. As a result, we have arrived at a point in time when TRANSVU will not run on the latest Windows operating systems (Windows 2000 or NT 5.0).

Since TRANSVU did not allow the data to be easily exported to GIS formats other than TRANSCAD and that operating systems were restricting its use, the need to provide for the on going preservation of the data by the user community became paramount. This paper was written with that spirit in mind.

The remainder of this paper is divided into two parts. The first presents a general overview of how to move the basic data into a GIS format. The second, and more important takes the user through a step-by-step application using the ESRI Corporation product, ArcView. **It must be noted that although this paper uses an example for a specific software it in no way should be construed as a product endorsement.** This paper was prepared with the sole purpose of providing the CTPP user community with a framework/methodology for preserving the basic CTPP data.

Questions or suggestions on improving this paper are appreciated. Send your comments to Nanda Srinivasan at [ns@camsys.com](mailto:ns@camsys.com)

## 2.0 General Instructions

## 2.1 Prepare Your Base GIS Layer from TIGER

The ESRI website has all the 1995 TIGER/Line files converted to shape files available for free. For more information, please visit

<http://www.esri.com/data/online/tiger/index.html>

ESRI also supplies enhanced version of TIGER/Line, and tips on using TIGER/Line along with other spatial databases.

### Alternately, you can follow these steps:

Step 1: Download any version of TIGER/Line from 1994-1998 that contains a TAZ layer from the Census Bureau website.

Step 2: Buy any commercial software that can convert TIGER/Line to a GIS Format

**Tip:** GIS Tools contains a commercial software to convert TIGER/Line to GIS formats.

The website is [www.gistools.com](http://www.gistools.com).

The vendor's description on the website states:

TGR2SHP and TGR2MIF Description:

TGR2SHP and TGR2MIF are 32 bit Windows applications for converting TIGER 99, 98, 97, 95, 94 and Census 2000 Dress Rehearsal files to ArcView shape files and MapInfo MIF/MID files, respectively. Version 4 of these programs have many features which make converting TIGER files a simple matter of point-and-click.

Another way to create a TAZ layer is by using equivalency files from the CTPP. The 1990 CTPP package also came with a block to TAZ equivalency file. These can be used to establish the geography files for the TAZ layer from blocks in TIGER/Line.

## 2.2. Obtain TRANSVU and 1990 CTPP CD-ROMs

**Step 1: Obtain the 1990 CTPP and software** from Bureau of Transportation Statistics for free.

To order for Statewide element, please visit:

<http://206.4.84.245/btsproducts/category.cfm?Category=111>

For the Urban element, please visit:

<http://206.4.84.245/btsproducts/category.cfm?Category=110>

**Tip:** You can also e-mail the CTPP Working Group at [ctpp@fhwa.dot.gov](mailto:ctpp@fhwa.dot.gov) to order.

Follow the instructions provided on the CD-ROM and install TRANSVU and the data base for the area desired. To run TRANSVU on NT 4.0, you will need a patch. It can be downloaded from: <http://www.bts.gov/programs/btsprod/setupnt.exe>. Should you have

any problems the data you can telephone the BTS Product Distribution Center at 202-366-DATA (202-366-3282).

Note: TRANSVU will not work on Windows 2000, or NT 5.0. There is no patch.

**Step 2:** Install and run TRANSVU, and select the tables you want to attach to the TAZ layer in TIGER/Line.

**Step 3:** Export the table (using the dbf or csv option) from TRANSVU.

### **2.3 Messaging the Data**

Based on the software used, you may need to arrange the fields, and create “key” fields to join the data. For example, for export to Arcview, section 3.3 details a few steps.

### **2.4 Join the Tables Using Your GIS Software**

**Step 1:** Open a new session of your GIS Software, and add the TAZ Layer to the view.

**Step 2:** Add the Exported dbf table.

**Step 3:** Open the attribute table associated with the TAZ layer, and the exported DBF table together. Highlight the TAZ fields in both, and join them together.

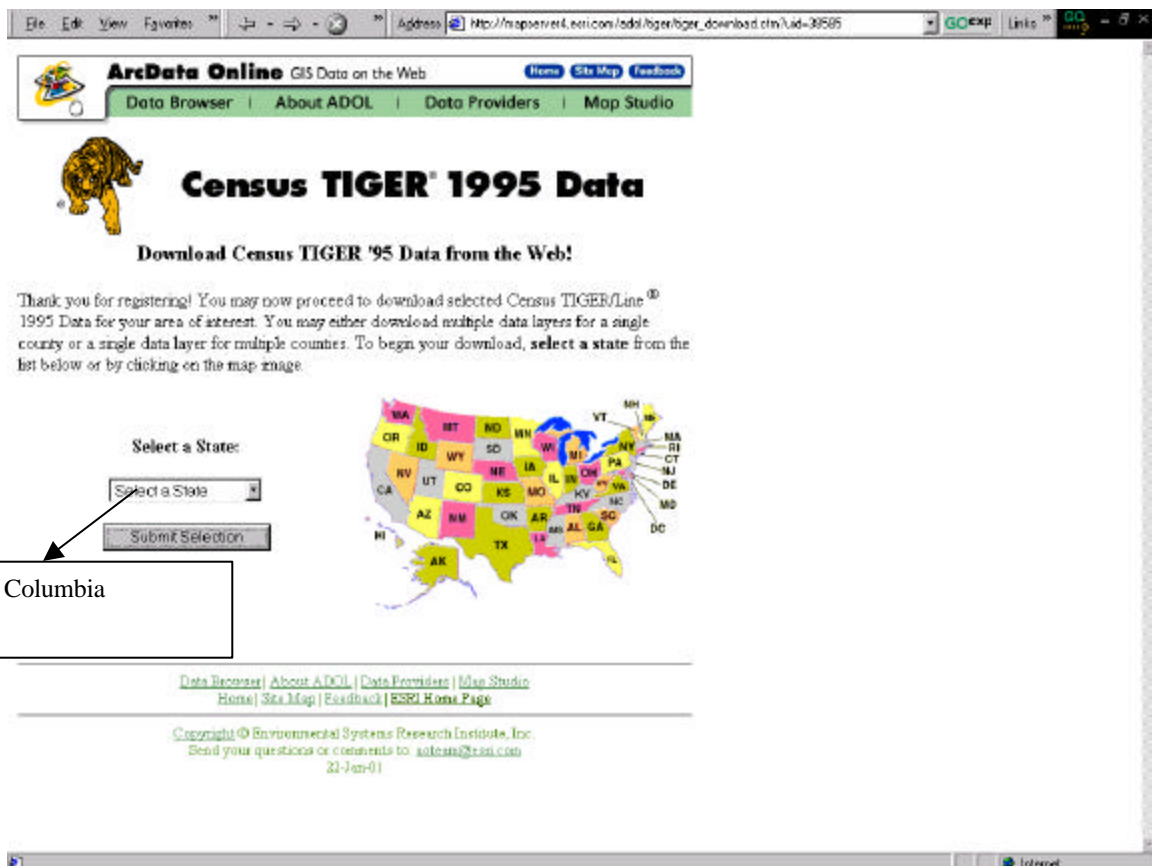
You can now do overlay analysis using the data fields in the 1990 CTPP.

### 3.0 Step-by-Step Instructions for the Washington, D.C. Area

This section demonstrates the method outlined in Section 2. Washington D.C. is used as an example.


#### 3.1. Prepare the Geography layer

**Step 1:** Go to the ESRI website and in order to download the TAZ layer for Washington D.C. The URL is <http://www.esri.com/data/online/tiger/index.html>. You will need to register for free at the website for any downloads. In the screen that appears after completing registration, select Washington D.C.



**Step 2:** A new screen comes up with options on layers. Under select by layer, choose Traffic Analysis Zones (TAZs)

**ArcData Online** GIS Data on the Web  
Data Browser | About ADOL | Data Providers | Map Studio

 **Census TIGER® 1995 Data**

**Download Census TIGER '95 Data from the Web!**

You have selected the state of **District of Columbia**. If you would like to download one or more data layers for a single county in District of Columbia, then **select a county** from the list below. If you would like to download a single data layer for one or more counties in District of Columbia, then **select a layer** below.

Select by County      OR      Select by Layer

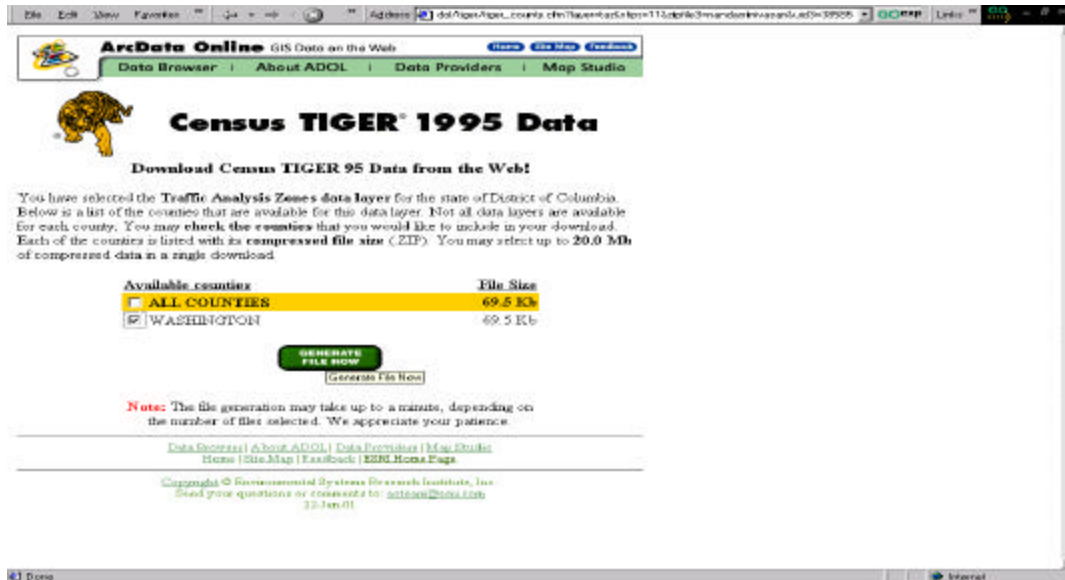
    

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22-Jan-01

**Step 3:** On the next screen, choose the county you need (in this case Washington D.C. and generate the file. You can choose more than one county in the beginning, or even the entire state.





**Step 4:** The file comes in a zipped format. Download it and then use an Unzipping tool to extract the shape files. In this case, we saved the files to a new folder called d:\1990ctpp.

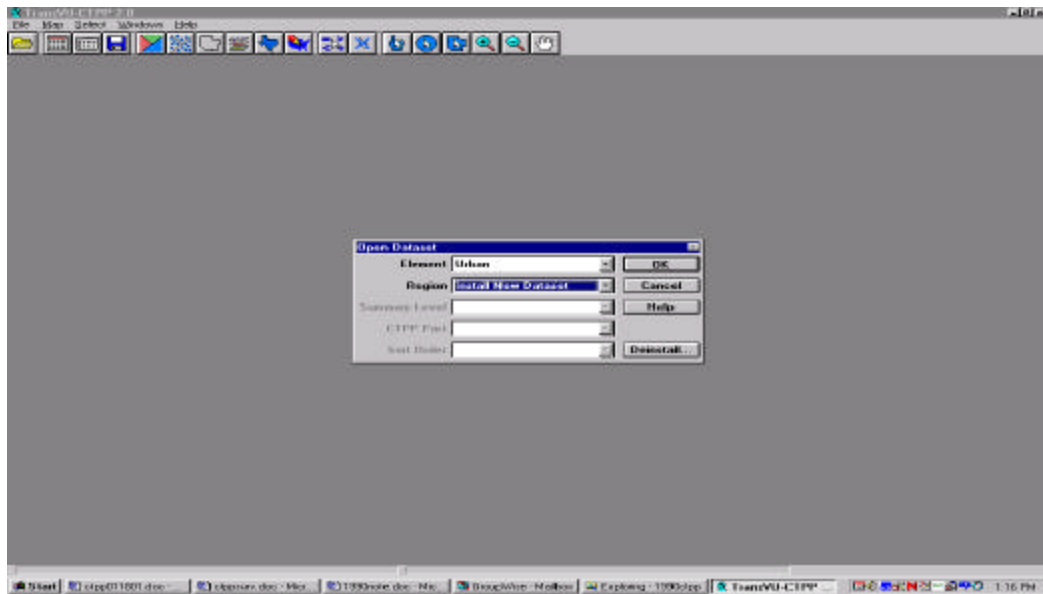
**Step 5:** Close internet explorer/Netscape/the web browser.

### 3.2 Download Transvu Software and Open a Session

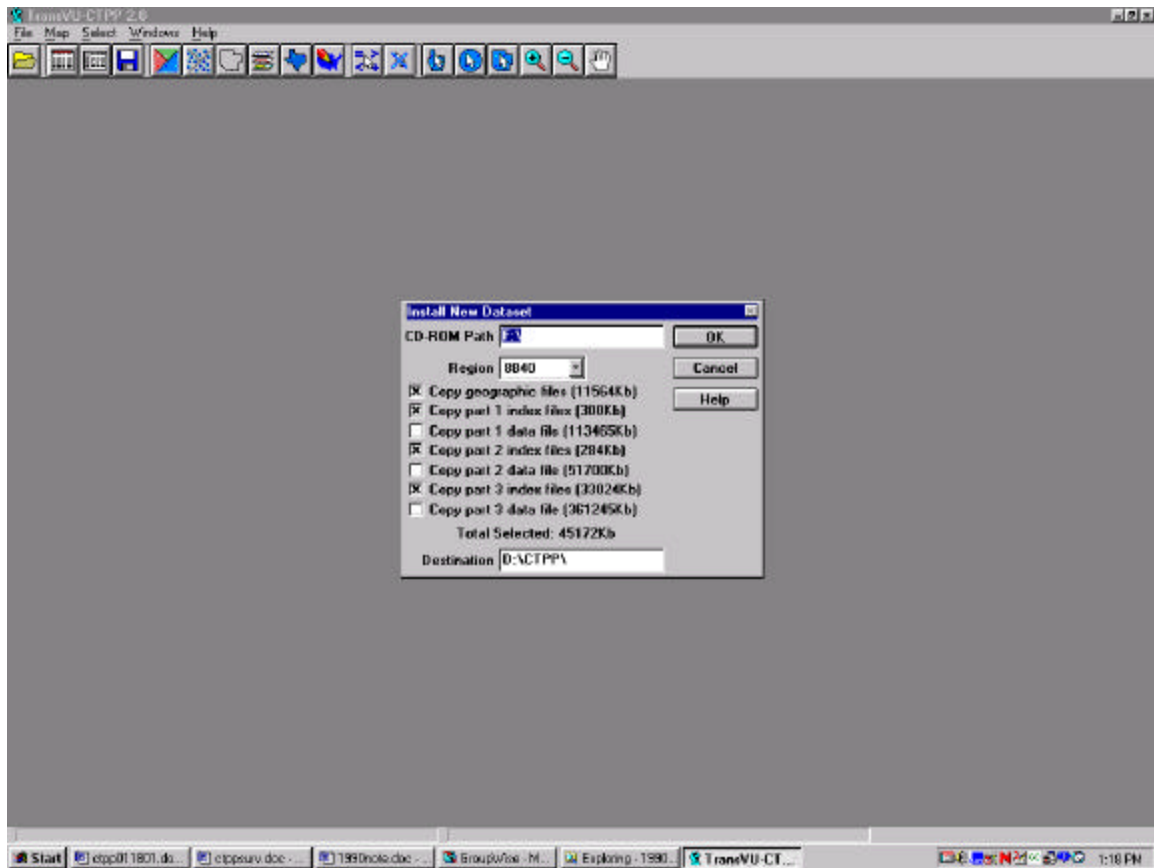
**Step 1:** TRANSVU can be downloaded from <http://www.bts.gov/programs/btsprod/setupnt.exe>.

When this URL is accessed, a window pops up saying “You have chosen to download a file from this location. Run from current location or save to a disk.” You can either save the file to your hard drive or run the installation from the website. The installation typically takes 20 seconds. We used d:\transvu as the installation folder (You can choose any drive. For example, you may find more space on the c:\ drive).

**Step 2:** Run TransVu by double clicking on the icon the installation software creates for you. On the screen that appears, click on “Install new dataset” option. A new screen appears as shown below.

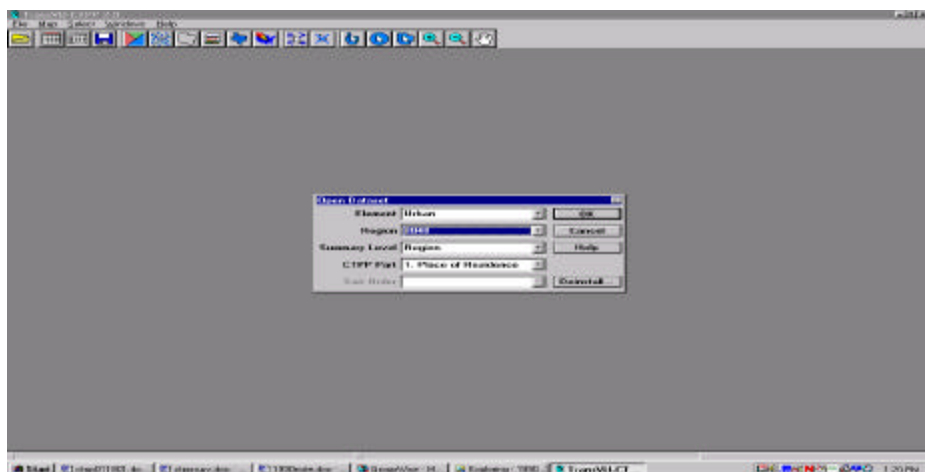


**Step 3:** Insert the CD containing data for your area. We inserted the CD-ROM with the CTPP Urban Element for the District of Columbia, “BTS-05-16” CD-ROM, and changed the path to f:\ drive (the CD-ROM drive on our machine). The following screen now appears.

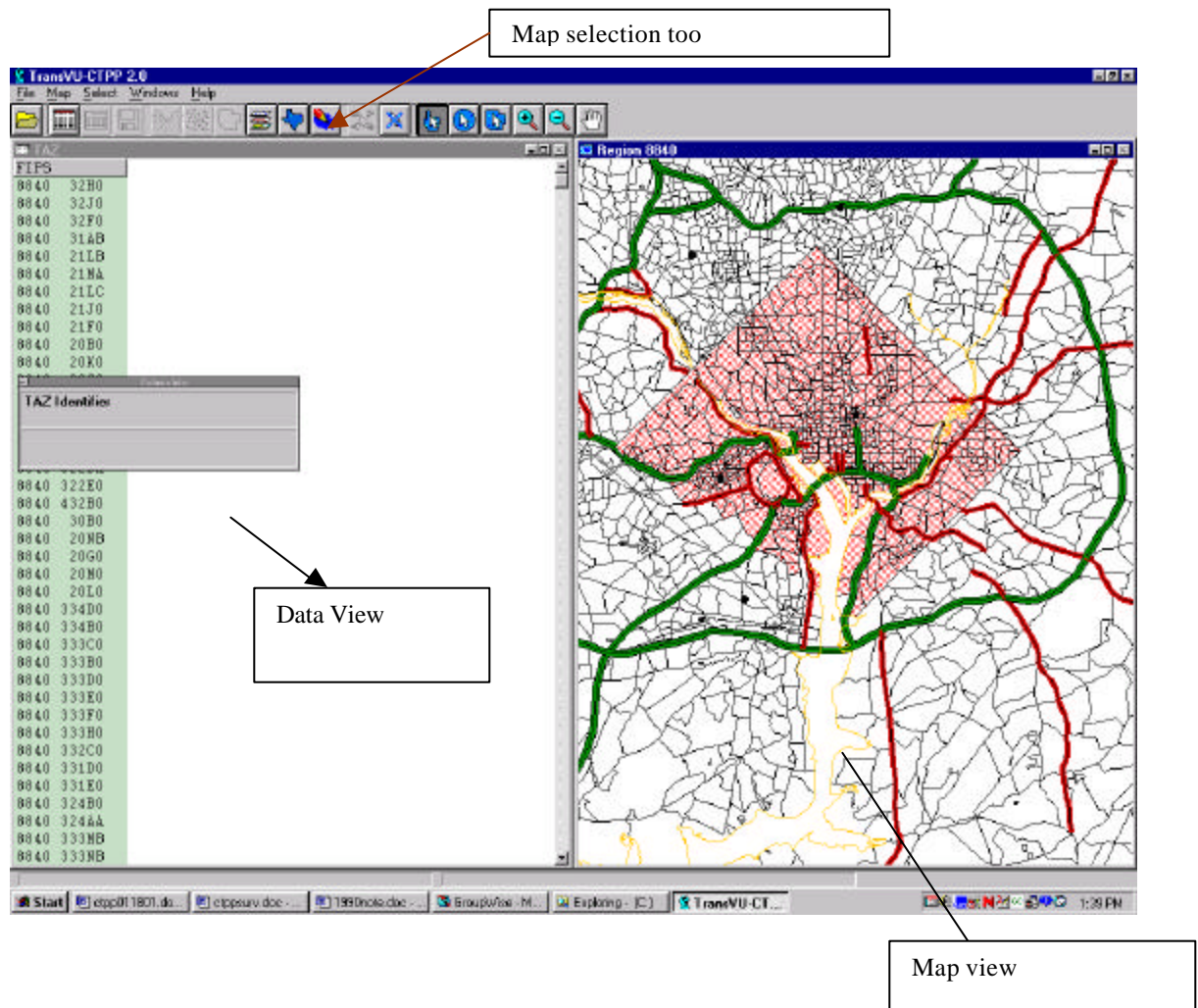


**Step 4:** Select all options and click ok.

**Step 5:** A new screen comes (as shown below). up with options on summary level and CTPP Part. We chose TAZ as summary level, and Place of residence, because we wanted to export place of residence data to the GIS. You can also choose place of work, or journey to work. For journey to work data, you need to consider that the matrices are large, and the flow data cannot be easily displayed graphically.



**Step 6:** A new screen comes up (as shown below), with a map-screen on one side, and the data screen on the other. Using the map selection tool, we selected all the TAZs we needed the data for. You do not have to do this, in case you want the entire data set to be exported, skip this step.

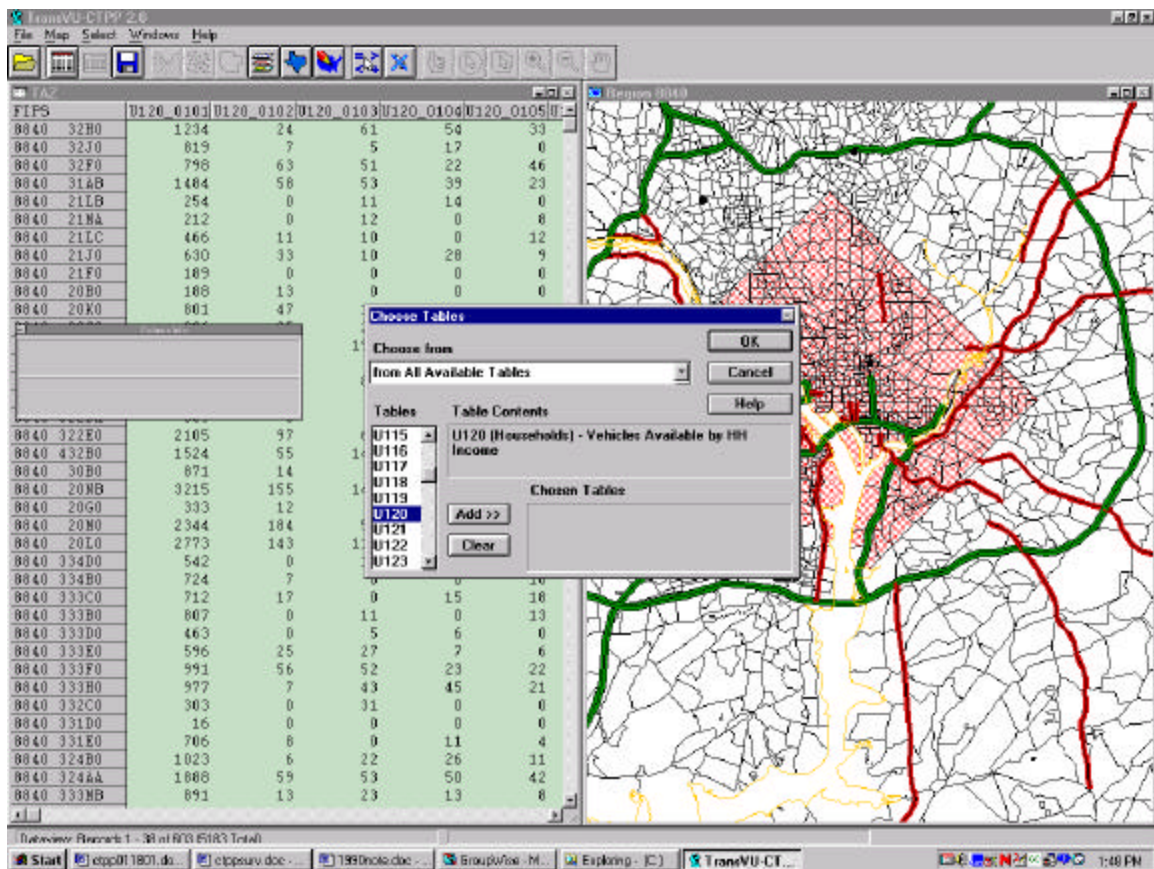


**Step 6:** Select the table(s) you want to export.

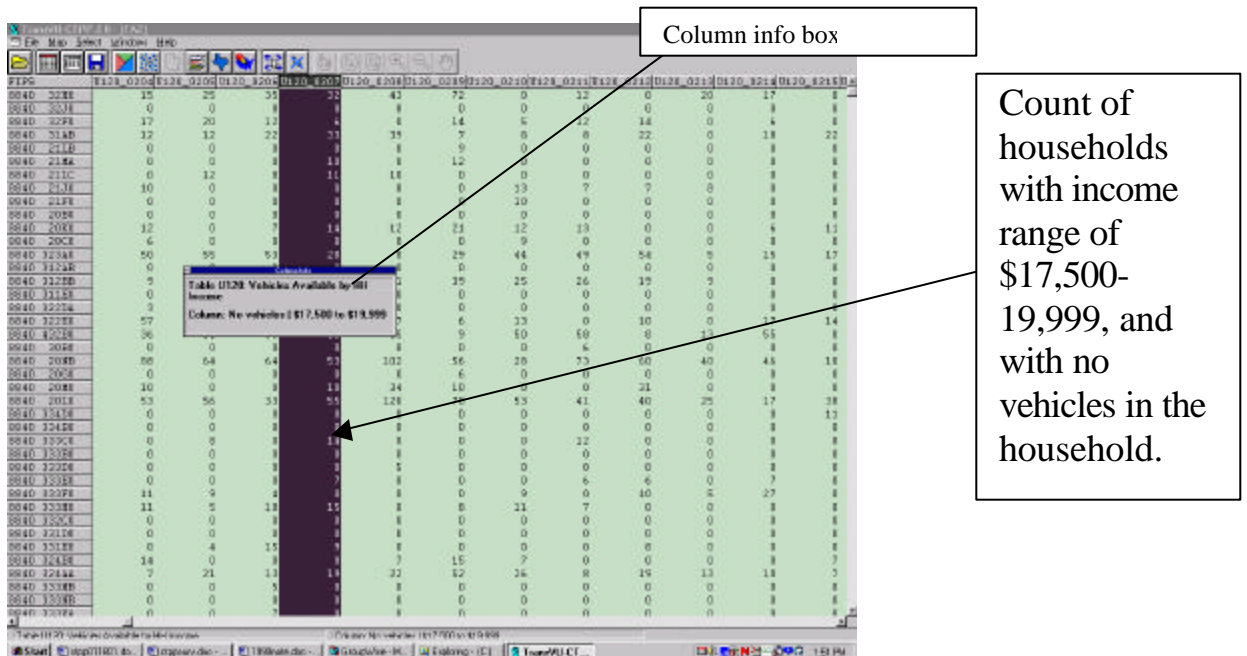
Using File ———> Choose Tables, we chose Table U120

This table contains counts of households stratified by household income and auto-ownership at the residential end.

Tip: By double clicking on a column, you can find out exactly what data the column contains.



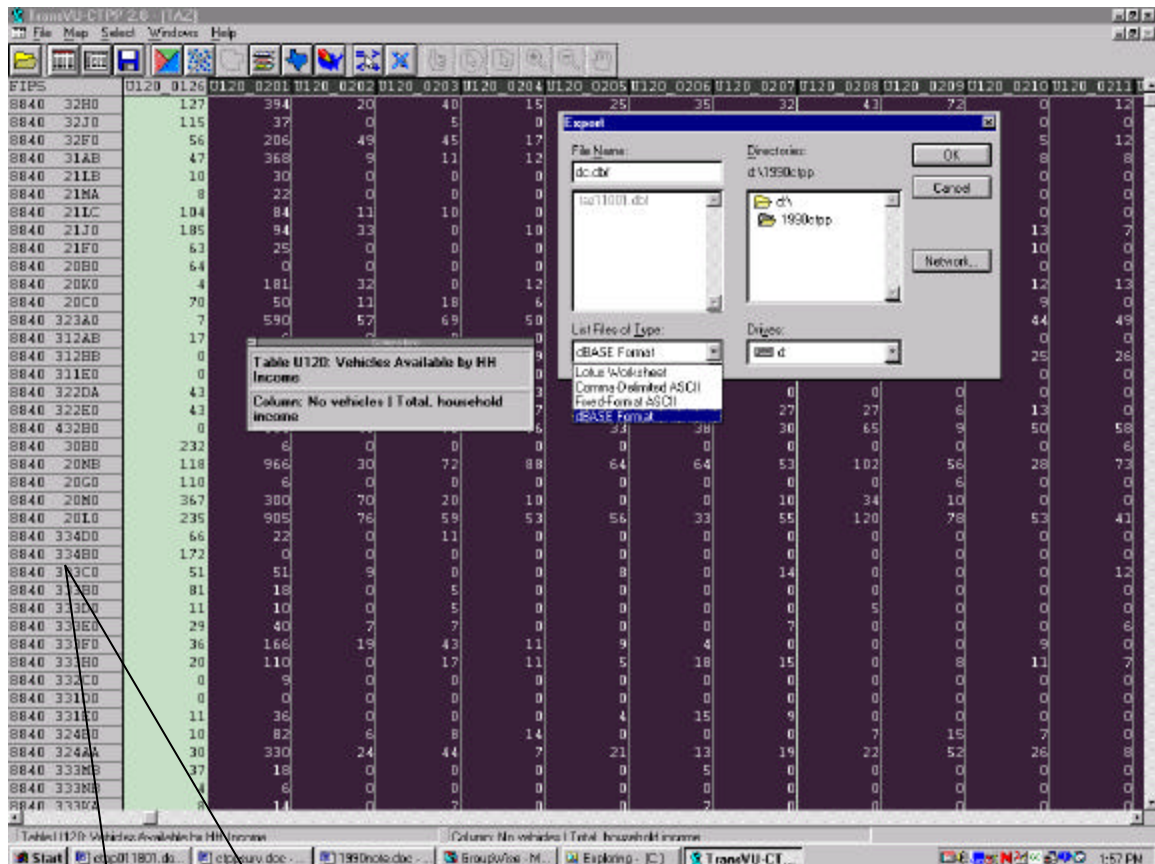
For example, the column highlighted in the screen shot below contains count of households with income range of \$17,500-19,999, and with no vehicles in the household.





## Step 7: Export to DBF Files.

We selected all columns and exported them as dbf format. Click on File and then Save As .dbf. We saved this file in d:\1990ctpp folder (the folder where we kept my TIGER/Line TAZ layer).



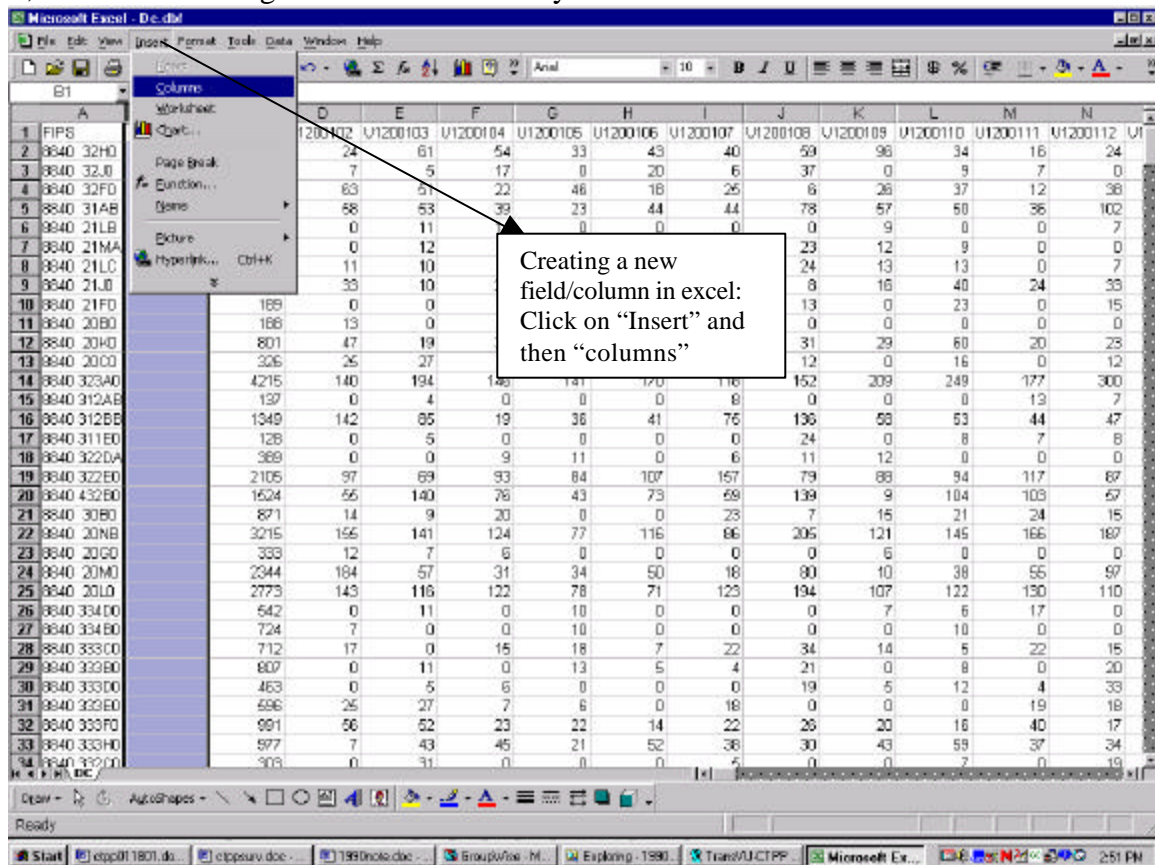
## 3.3 Massaging the Data

We chose ArcView as our GIS to import CTPP data. Since we intend to get this table to arcview, we need to create a column in both the CTPP table in dbf and the TIGER layer that will serve as the common field in a join. This field is called the key field in database jargon. The FIPS in TRANSVU actually contains a region code and the TAZ concatenated together. We need to separate the region code from the TAZ code.

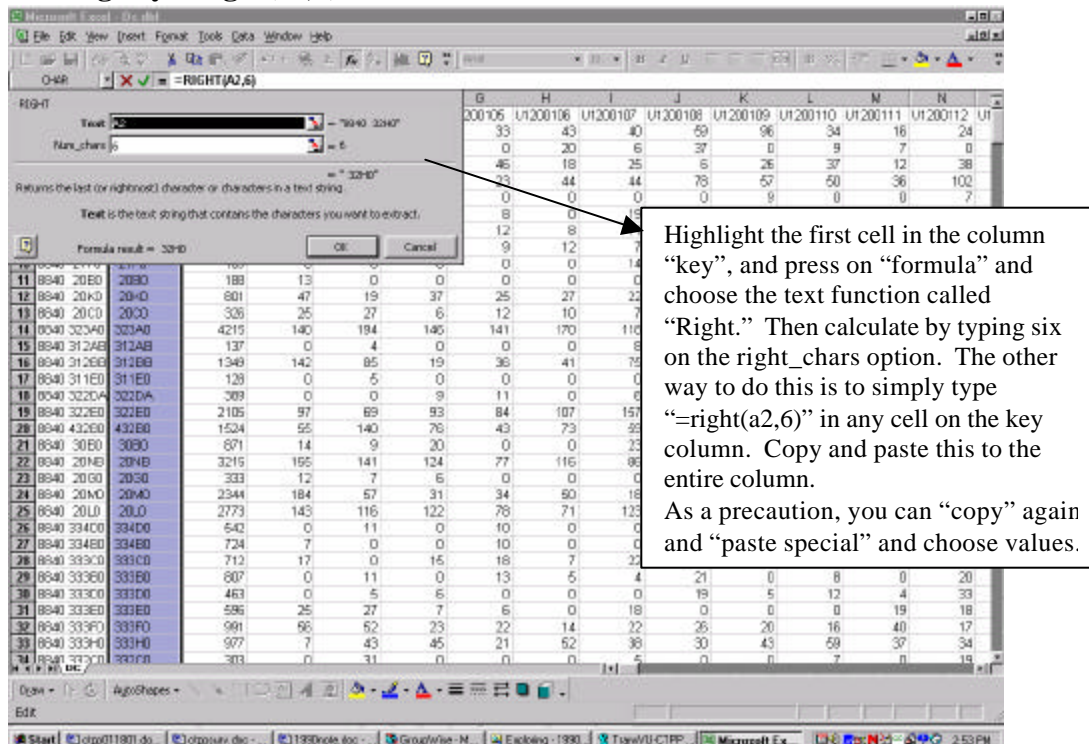
**Step 1:** To do this, we need to create a column for just the TAZ numbers. The CTPP table in dbf contains a regional code (shown above) plus the TAZ number. So, we opened the table dc.dbf in excel and created a new field called key. Next we entered the formula that will take just the right six numbers from the “fips” column and put them in the “key” column.

The following screen shots demonstrate how to create a new field/column in Microsoft

Excel, and calculate the right six fields into the “key” field/column.

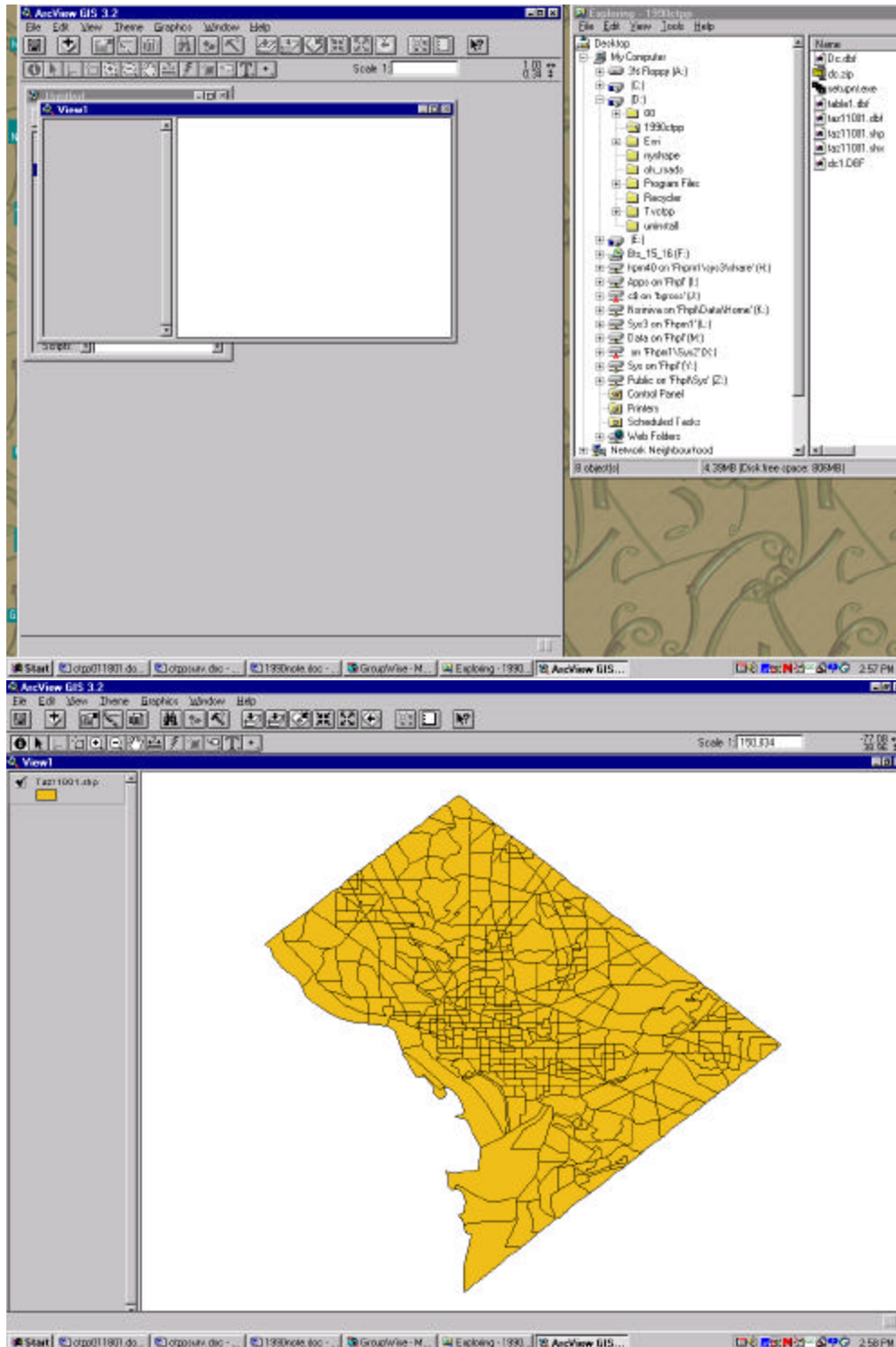


Calculating key = right(a2,6)



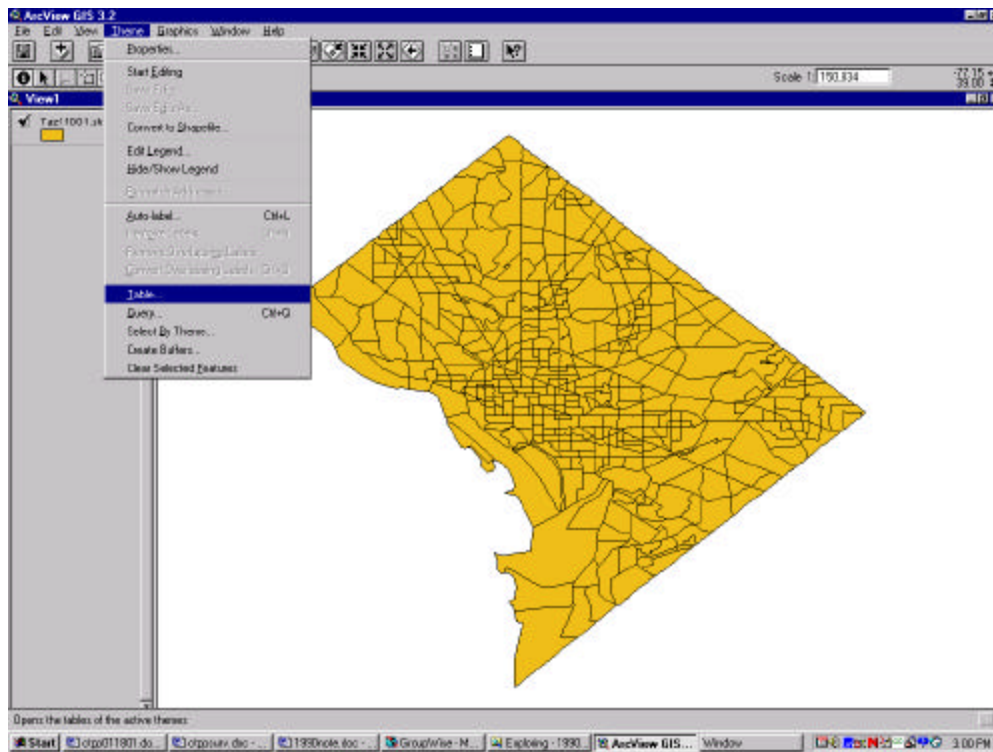
We saved this as a new dbase file dc1.dbf. This is not really necessary, you could have over written the old file.

**Step 2:** Start a new Arcview session, add a view, and add the shape file for Washington, D.C. from the folder (d:\1990ctpp\).





**Step 3:** Open the attribute table for this shape file by clicking on “theme” then “table”, and do the same massaging as the CTPP Data file. This is because the TAZ field in the attribute table for the TIGER Shape contains the “county” code concatenated to the TAZ code.

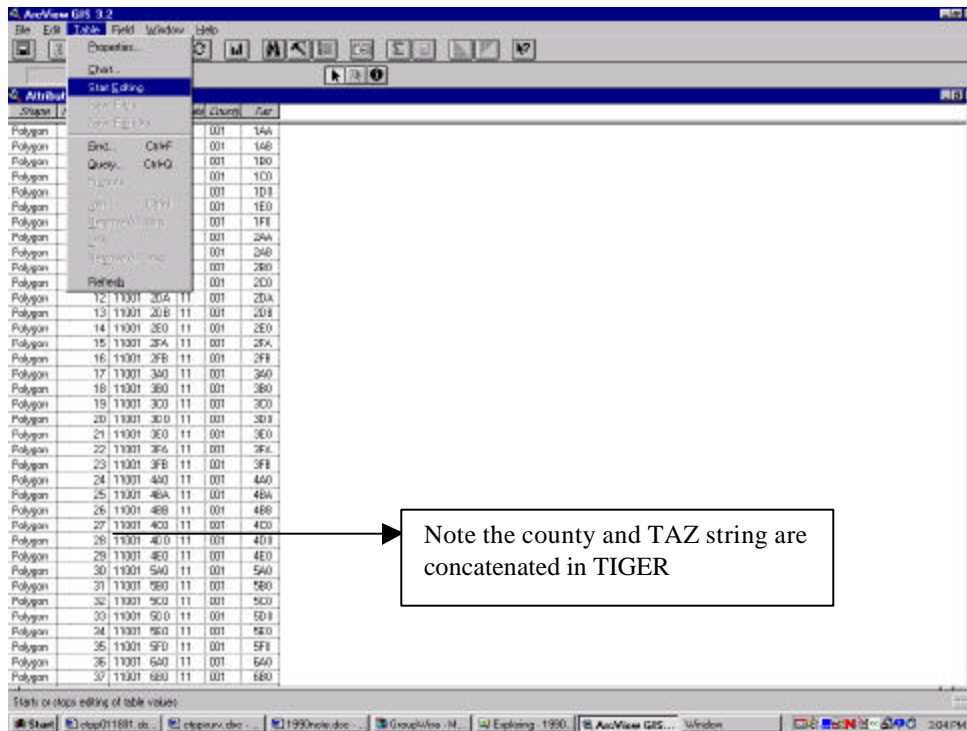


Attributes of Taz11001.shp

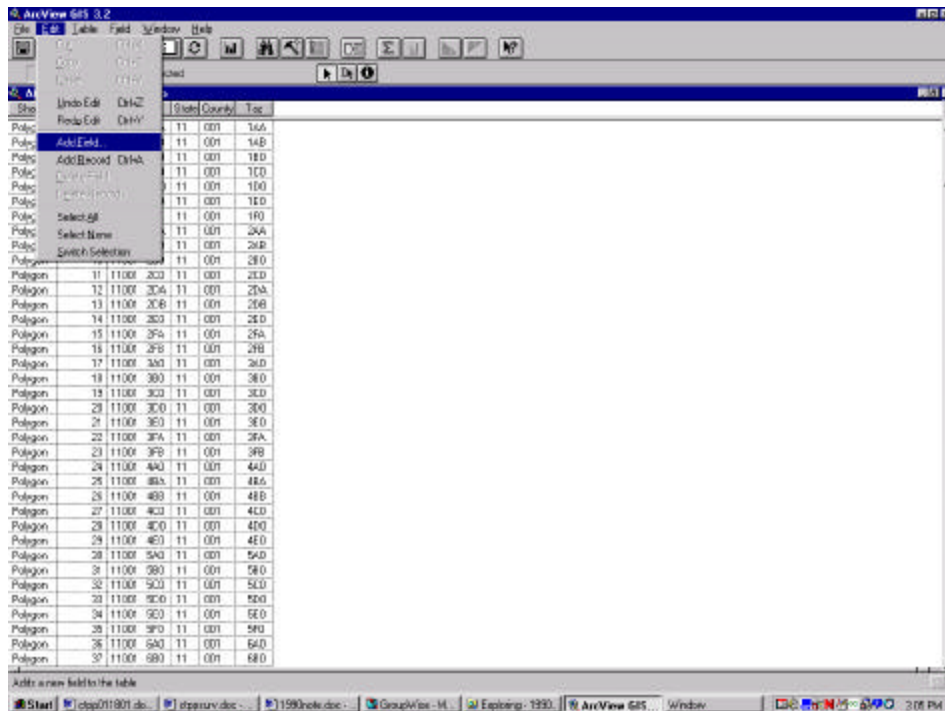
Shape	Record_id	Key	State	County	Taz
Polygon	1	111001 1AA	11	001	1AA
Polygon	2	111001 1AB	11	001	1AB
Polygon	3	111001 1B0	11	001	1B0
Polygon	4	111001 1C0	11	001	1C0
Polygon	5	111001 1D0	11	001	1D0
Polygon	6	111001 1E0	11	001	1E0
Polygon	7	111001 1F0	11	001	1F0
Polygon	8	111001 2AA	11	001	2AA
Polygon	9	111001 2AB	11	001	2AB
Polygon	10	111001 2B0	11	001	2B0
Polygon	11	111001 2C0	11	001	2C0
Polygon	12	111001 2D0	11	001	2D0
Polygon	13	111001 2E0	11	001	2E0
Polygon	14	111001 2F0	11	001	2F0
Polygon	15	111001 2FA	11	001	2FA
Polygon	16	111001 2FB	11	001	2FB
Polygon	17	111001 3A0	11	001	3A0
Polygon	18	111001 3B0	11	001	3B0
Polygon	19	111001 3C0	11	001	3C0
Polygon	20	111001 3D0	11	001	3D0
Polygon	21	111001 3E0	11	001	3E0
Polygon	22	111001 3FA	11	001	3FA
Polygon	23	111001 3FB	11	001	3FB
Polygon	24	111001 4A0	11	001	4A0
Polygon	25	111001 4BA	11	001	4BA
Polygon	26	111001 4BB	11	001	4BB
Polygon	27	111001 4C0	11	001	4C0
Polygon	28	111001 4D0	11	001	4D0
Polygon	29	111001 4E0	11	001	4E0
Polygon	30	111001 5A0	11	001	5A0
Polygon	31	111001 5B0	11	001	5B0
Polygon	32	111001 5C0	11	001	5C0
Polygon	33	111001 5D0	11	001	5D0
Polygon	34	111001 5E0	11	001	5E0
Polygon	35	111001 5FA	11	001	5FA
Polygon	36	111001 5FB	11	001	5FB
Polygon	37	111001 6B0	11	001	6B0

The screen shots above demonstrate how to view the table for the shape file added in the view.

**Step 4:** Put the table in “edit” mode by clicking on “table” and “start editing” as shown below.



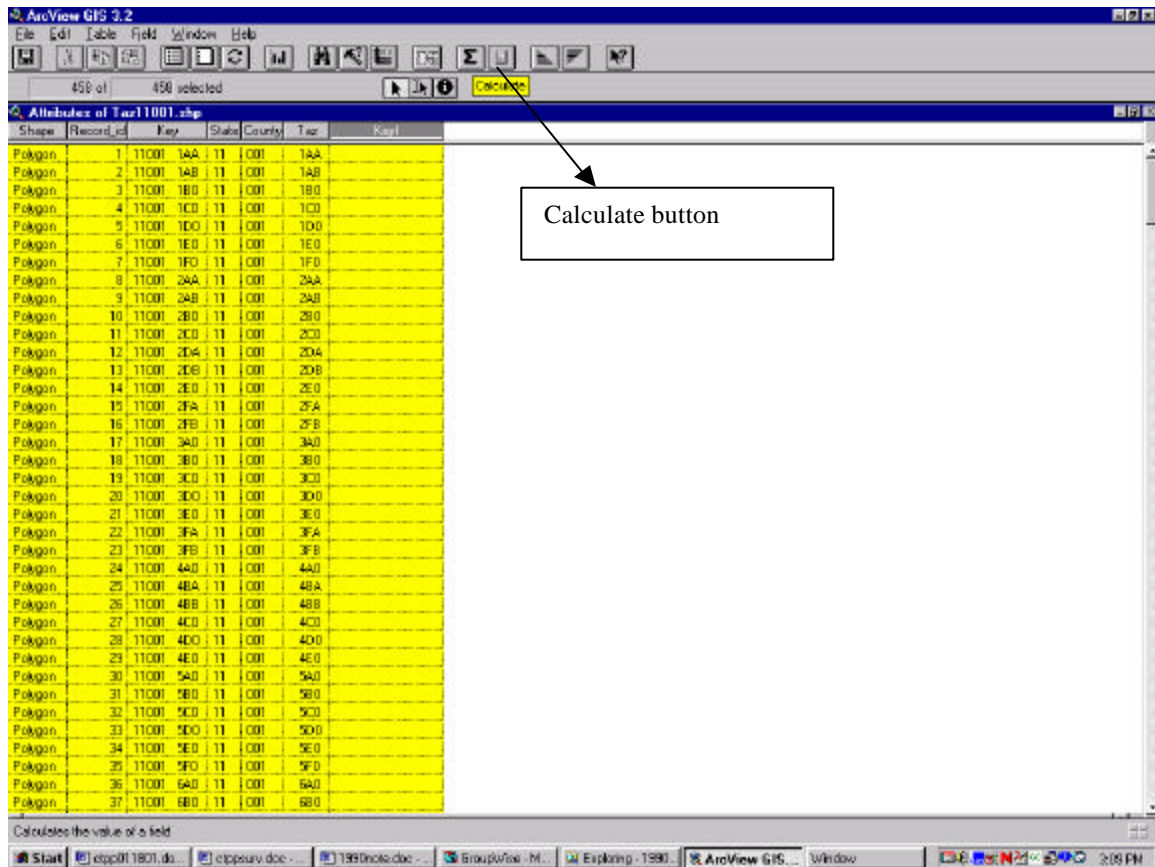
**Step 5:** Add a new field/column by clicking on “edit”, add then “add field” as shown below”



**Step 6:** Make this field a “string” (ArcView’s name for a character field), and calculate it as the right 6 characters of the County + TAZ field. We called this new field “Keyf.”

### Demonstration:

Select all records and press the calculate button. To select all records Click on “edit” and then “select all.” All the rows now get highlighted in yellow. Now click on the header “keyf” so it gets highlighted in dark grey. Press the “calculate” button as shown in the following screen-shot.



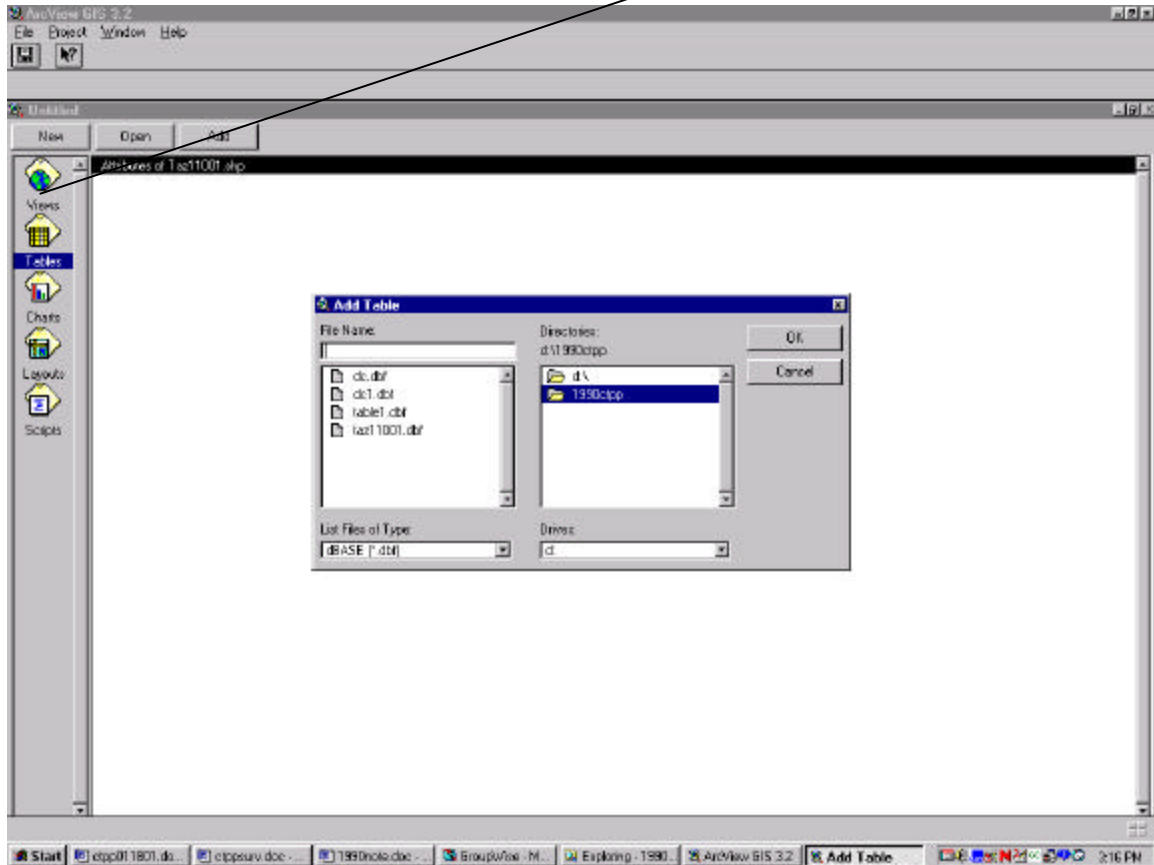
In Arcview the syntax is Keyf = [key].right(6)

This will calculate all the rows in the column (field in ArcView) as the 6 right most characters in the “Key” field (the County +TAZ Field). The heading on top of the column should be keyf. We highlighted that field, and then pressed the calculate button. The following screenshot should appear.



### 3.4: Add the massaged CTPP Table into ArcView and join it with the geography file.

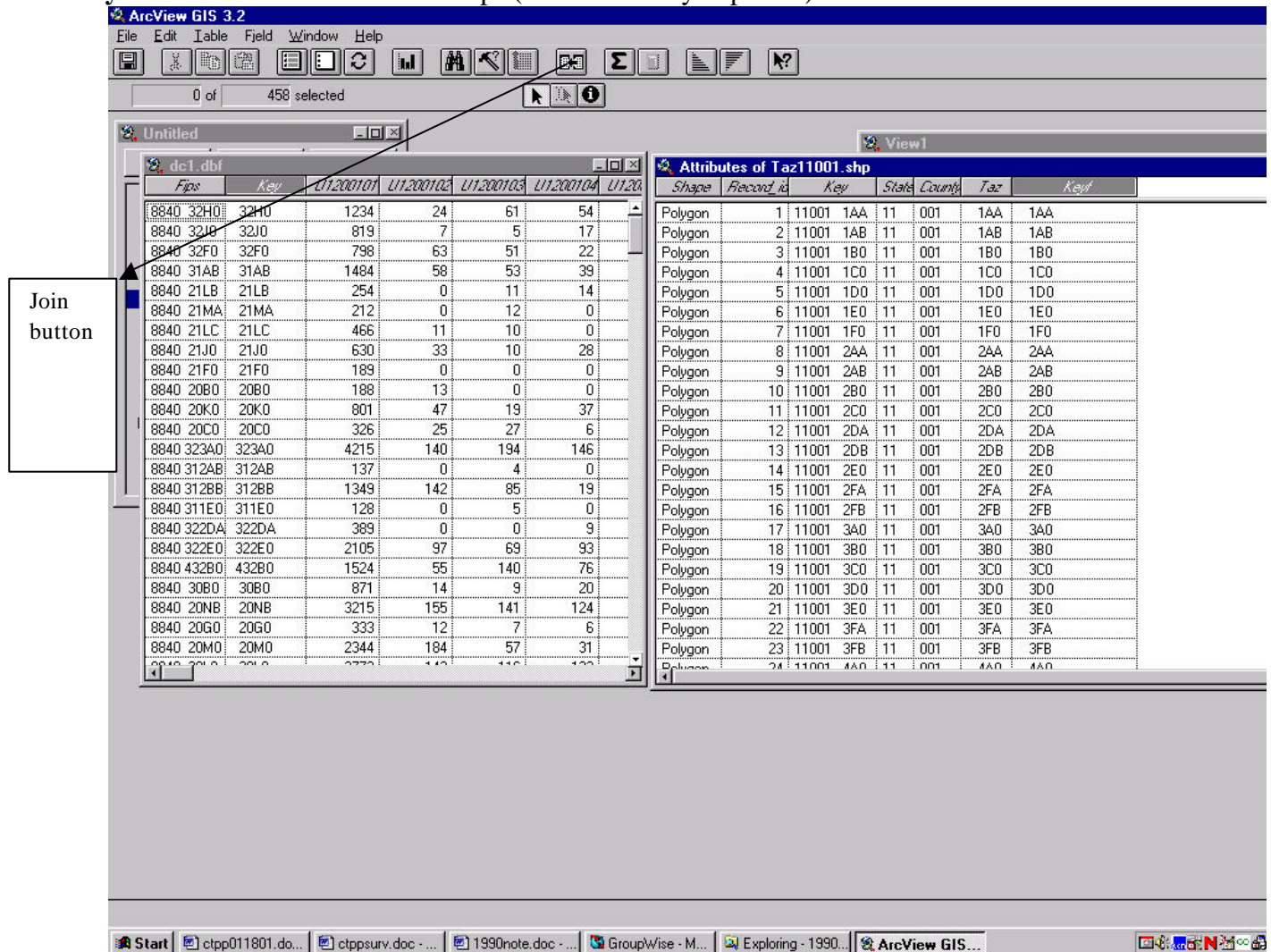
**Step 1:** Add the ctp table (dc1.dbf) using **ADD TABLE** from the Arcview **project** directory:



**Step 2:** Open both the tables by double clicking on them, and arrange the sizes of their windows so that they can be viewed simultaneously. The next screen shot shows how the computer screen should look.



**Step 3:** Viewing both the tables together, click on the “key” field in dc1.dbf, and the “keyf” field in “Attributes of 11001.shp” (the order is very important).



**Step 4:** Click on the “join” button to (“finally”) attach the datafile to the shapefile. Congratulations. You have now transferred your CTPP Data file into a GIS. You can now either save the shapefile into another new shape file, or just save the Arcview project. The following screen shot suggests how the new “Attributes of TAZ110001,SHP” table should look. You can now go to the “view” and make some colorful plots!

ArcView GIS 3.2a

File Edit Table Field Window Help

0 of 450 selected

Attributes of Taz1001.shp

Shape	Record ID	Age	State	County	Tax	Land	Fire	U1,200101	U1,200102	U1,200103	U1,200104	U1,200105	U1,200106	U1,200107	U1,200108	U1,200109	U1,200110	
Polygon	1	11001	1AA	11	001	1AA	1AA	8840	1AA	84	21	15	0	0	7	0	7	9
Polygon	2	11001	1AB	11	001	1AB	1AB	8840	1AB	339	56	34	10	0	7	20	16	13
Polygon	3	11001	1B0	11	001	1B0	1B0	8840	1B0	646	89	57	46	0	52	42	33	15
Polygon	4	11001	1C0	11	001	1C0	1C0											
Polygon	5	11001	1D0	11	001	1D0	1D0											
Polygon	6	11001	1E0	11	001	1E0	1E0											
Polygon	7	11001	1F0	11	001	1F0	1F0											
Polygon	8	11001	2AA	11	001	2AA	2AA	8840	2AA	409	161	61	26	12	28	0	0	18
Polygon	9	11001	2AB	11	001	2AB	2AB											
Polygon	10	11001	2B0	11	001	2B0	2B0											
Polygon	11	11001	2C0	11	001	2C0	2C0											
Polygon	12	11001	2D4	11	001	2D4	2D4	8840	2D4	498	65	39	16	16	49	24	24	16
Polygon	13	11001	2E6	11	001	2E6	2E6	8840	2E6	89	0	16	0	0	8	8	8	0
Polygon	14	11001	2E0	11	001	2E0	2E0	8840	2E0	1321	57	49	16	17	50	56	80	48
Polygon	15	11001	2FA	11	001	2FA	2FA	8840	2FA	668	41	25	8	48	24	8	15	24
Polygon	16	11001	2FB	11	001	2FB	2FB	8840	2FB	315	8	8	0	8	8	17	32	16
Polygon	17	11001	3A0	11	001	3A0	3A0											
Polygon	18	11001	3B0	11	001	3B0	3B0											
Polygon	19	11001	3C0	11	001	3C0	3C0	8840	3C0	506	24	17	6	20	12	13	71	53
Polygon	20	11001	3D0	11	001	3D0	3D0	8840	3D0	432	24	66	22	13	29	31	37	9
Polygon	21	11001	3E0	11	001	3E0	3E0	8840	3E0	42	0	0	0	0	16	13	0	0
Polygon	22	11001	3FA	11	001	3FA	3FA	8840	3FA	87	0	0	0	0	0	0	0	0
Polygon	23	11001	3FB	11	001	3FB	3FB	8840	3FB	6	6	0	0	0	0	0	0	0
Polygon	24	11001	4A0	11	001	4A0	4A0											
Polygon	25	11001	4BA	11	001	4BA	4BA	8840	4BA	0	0	0	0	0	0	0	0	0
Polygon	26	11001	4BB	11	001	4BB	4BB											
Polygon	27	11001	4C0	11	001	4C0	4C0	8840	4C0	91	18	9	0	0	15	12	13	24
Polygon	28	11001	4D0	11	001	4D0	4D0	8840	4D0	513	265	100	43	13	0	54	5	0
Polygon	29	11001	4E0	11	001	4E0	4E0	8840	4E0	27	12	0	0	0	0	0	0	15
Polygon	30	11001	5A0	11	001	5A0	5A0											
Polygon	31	11001	5B0	11	001	5B0	5B0											
Polygon	32	11001	5C0	11	001	5C0	5C0	8840	5C0	11	0	0	0	0	0	0	0	0
Polygon	33	11001	5D0	11	001	5D0	5D0	8840	5D0	0	0	0	0	0	0	0	0	0
Polygon	34	11001	5E0	11	001	5E0	5E0											
Polygon	35	11001	5F0	11	001	5F0	5F0											
Polygon	36	11001	6A0	11	001	6A0	6A0	8840	6A0	3	0	0	0	0	0	0	0	0
Polygon	37	11001	6B0	11	001	6B0	6B0											

Start

c:\p011801.doc

c:\p011801.doc

1990note.doc

Groupwise - M...

Exploring - 1990...

ArcView GIS...

2:23 PM

The View can now depict TAZs with CTPP Data!

